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Attorney Docket No. 17564-136



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS : David Godfrey Williams

SERIAL NUMBER : 09/586,824

EXAMINER: R. Yan

FILING DATE : June 5, 2000

ART UNIT: 2854

FOR : IMPROVED STENCIL

Boston, Massachusetts

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF VALENTIJN VAN VELTHOVEN
UNDER 37 C.F.R 1.132

Sir:

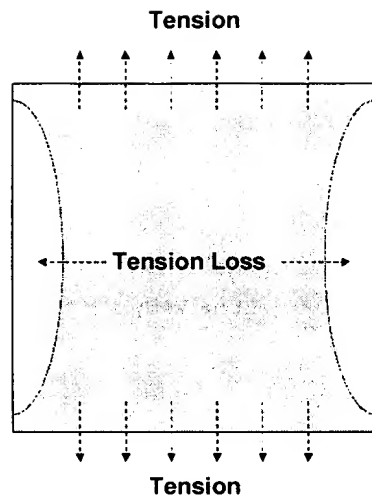
I, Valentijn Van Velthoven of 84 Orchard Lane, Berkeley Heights, New Jersey, declare and state that:

1. I have been employed as Global Stencil Business Development Manager by Cookson Electronics Assembly Materials since November 2002. A principal aspect of my role as business development manager has been studying and understanding the different types of stencils in the PCB-fabrication market and the market share of each type. Previously, I was European Marketing Manager for Assembly Materials from April 2001 through October 2002. From April 2000 through February 2001, I was General Manager for the Belgian Stencil Operation, which is one of Cookson Electronics Assembly Materials' largest stencil operations. I started my career with Cookson Electronics in 1995 as a sales manager of stencil print equipment with Speedline Technologies, Inc. d/b/a MPM (a former Cookson Electronics company).
2. I graduated from Nederlands Instituut voor Marketing (NIMA) with a bachelor degree in marketing.

3. I have reviewed U.S. Patent Application Serial No. 09/586,824 and its updated claims, as amended in the Amendment to be filed concurrently herewith, and I understand the contents of each. I have likewise reviewed published British Patent Application No. 2,264,460 A, and I understand its contents.
4. I am familiar with a stencil that matches the drawings and description provided in GB 2,264,460; I am also familiar with the market performance of this stencil. This stencil was commercially marketed as the "MicroMount" stencil and was manufactured by Micro Metallic, Ltd. in England. The MicroMount stencil includes slotted apertures for engagement with mounting teeth on a tensioning frame along two edges of the stencil.
5. I am familiar with a stencil that fits the description of the claims of USSN 09/586,824, as amended in the accompanying amendment. I am also familiar with the development of this stencil and its market performance. This stencil was commercially marketed as the "TETRA stencil" and was likewise manufactured by Micro Metallic on behalf of Cookson Electronics Assembly Materials. The TETRA stencil includes slots for engagement with mounting teeth on a tensioning frame along all four edges of the stencil. The TETRA stencil was originally known as the "Vector Mount" stencil, though the name, "TETRA stencil," is used to refer to this stencil throughout this Declaration for purposes of clarity and ease of reference.
6. Unlike elastic stencils, such as those described in U.S. Patent 2,073,379 (issued to Rasmussen), both the MicroMount and TETRA stencils are made of metal and are substantially inelastic.
7. In correction/clarification of a statement made in the previously filed Declaration, a stencil matching the description of GB 2,264,460 was on the market, under the mark, "MicroMount," before I began work for Cookson in 1995. An earlier frameless-stencil design was marketed under the mark, MicroMount, as early as 1989. I understand that the MicroMount stencil design that was on the market in 1995 was developed in conjunction with the tensioning frame described in GB 2,264,460 for engagement along two edges of the stencil. Unlike earlier stencils designed for the printed circuit board

industry, the MicroMount stencil consisted of a slotted metal foil and was termed, a “frameless” stencil, because it did not include the traditional structure of a rigid frame and an elastic mesh glued to the apertured body (hereafter, referred to as a “mesh-and-frame stencil”). We believe that the MicroMount stencil was the first stencil to be designed so as to be replaceably (*i.e.*, not permanently) mounted on mounting teeth for printing solder, adhesives, flux gel, *etc.*, onto a printed circuit board, and it was designed in an effort to serve a need in the printed-circuit-board industry for an alternative to traditional mesh-and-frame stencils that was simpler, more-easily fabricated, not subject to stretching and debonding (of the mesh), and capable of being subject to greater and more-uniform tension. Other companies likewise produced other frameless stencils after the introduction of the MicroMount stencil; however, the combined frameless-stencil market remained much smaller than the market for mesh-and-frame stencils.

8. The sales estimates in this paragraph and in paragraph 11 have been revised from those provided in my previous Declaration based on newly obtained market information and after further additional investigation. The MicroMount stencil had the largest market share in the PCB fabrication industry among frameless stencils until the introduction of the TETRA stencil. The MicroMount stencil generally accounted for about 66% of the overall frameless stencil market in the PCB fabrication industry; this market peaked at sales of about 7500 stencils/year in the PCB fabrication industry in 1997 (the MicroMount stencil accounting for about 5,000 of those sales), the year preceding the introduction of the TETRA stencil. In comparison with the sales of frameless stencils in the PCB fabrication industry after the introduction of the TETRA stencil (see paragraph 11, below), these sales figures are very small. Feedback from customers indicated that limitations of these frameless stencils, particularly difficulties and drawbacks associated with their tensioning, were perceived by many to outweigh their advantages. Typically, bi-directional (two-sided) tensioning of the MicroMount and similar stencils would produce areas subject to reduced tension along the stencil’s non-tensioned sides, thereby compromising print accuracy and reducing the useable print area, as is schematically illustrated in the drawing below:



9. The TETRA stencil, described in USSN 09/586,824, was developed as an improvement on the MicroMount stencil after the inventor discovered that the MicroMount stencil could bow slightly inward at the un-tensioned edges (notwithstanding efforts to apply tension uniformly across the two edges) to form a slight hourglass shape in the stencil. This bowing effect could result in displacement of the stencil apertures through which solder is printed and, hence, in misplaced solder deposits on a printed circuit board.
10. All four apertured edges of the TETRA stencil could not be engaged by the tensioning frame described in GB 2,264,460. Consequently, a new tensioning frame (*i.e.*, the "TETRA frame") was developed to enable engagement of a stencil along four edges. Accordingly, the TETRA stencil and tensioning frame, both described in USSN 09/586,824, were jointly developed to enable four-sided stencil engagement and tensioning; and we believe that both the frame and the stencil were novel and that the benefits that were obtainable therewith were previously unrecognized.

11. The TETRA stencil of USSN 09/586,824 was first introduced to the market in 1998. I believe that the TETRA stencil was the first metal stencil to enter the market with a plurality of slots along four edges of the stencil. All or nearly all customers quickly switched from the MicroMount stencil of GB 2 264 460 to the TETRA stencil after the latter was introduced, and many times more stencils were sold after the introduction of the TETRA stencil. The sale of TETRA stencils in its first year of production (*i.e.*, about 35,000 stencils) dwarfed the sale of MicroMount stencils that same year (*i.e.*, about 250 stencils) and also finally, after the limited success of two-sided frameless stencils, signaled a substantial industry-wide customer migration from the traditional mesh-and-frame stencils to the new frameless stencils. The sales of TETRA stencils continued to grow thereafter up to the present day. Moreover, the strongly positive market reaction to the TETRA stencil contributed to the overall market acceptance of “frameless systems,” and many other companies began producing similar frameless stencils having apertures along four sides for engagement along each of the four sides. The overall market for frameless stencils skyrocketed from about 7,500 stencils/year to about 60,000 stencils/year in the year following the introduction of the TETRA stencils and sales have increased thereafter. The overall market for stencils (both framed and frameless) in the PCB fabrication industry did not change in large measure over this time frame. Absent this invention, we also would have expected annual sales of the TETRA stencil, which replaced the MicroMount stencil in the market, to have increased only moderately each year (accounting for growth in the industry) from the approximately 5,000 MicroMount stencils sold in 1997. However, the annual sales of 35,000+ TETRA stencils were clearly much greater both in terms of market share and in gross numbers.
12. Most of the frameless stencils sold after the introduction of the TETRA stencil were stencils that had a plurality of slots along four sides and were engaged by a tensioning apparatus at multiple locations along each edge, with most stencils produced by competitors likewise adopting a stencil design wherein slots are provided along four edges of the stencil. Accordingly, sales of stencils described in the independent claims are estimated to have increased from a market share of zero to a majority market share of

frameless stencils in the year that the TETRA stencil was introduced to the market. Examples of stencils introduced by competitors after the TETRA stencil was introduced are illustrate in the following appendices:

Appendix A: webpages and engineering drawing (dated May 11, 1998) for stencil manufactured by Quick Tensioning Systems, Inc.; the stencil includes a plurality of slots along each of its four edges;

Appendix B: LTC webpages showing their QUATTRO-FLEX™ stencil, which includes a plurality of slots along each of its four edges;

Appendix C: Laserjob webpages depicting a stencil that has slots along all four edges;

Appendix D: U.S. Patent 5,979,313, “Stencil Holder Having Independently Movable Tensioning Elements”; Assignee: bebro-electronic Bengel & Bross GmbH; filed: July 1, 1998; and

Appendix E: U.S. Patent 6,038,969, “Tensioning Frame”; Assignee: LPKF d.o.o; filed: November 10, 1998.

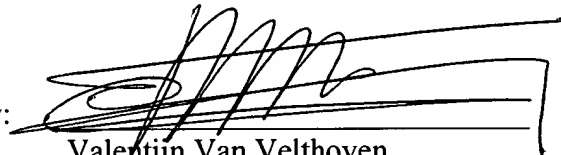
13. There were no significant differences in the TETRA stencil and the version of the MicroMount stencil that had been on the market since at least 1995 other than the provision of slots along the other two edges in the TETRA stencil. Though, there were differences in the tensioning frames used for the two different stencils, particularly in the use of a pneumatic system in the TETRA tensioning frame for engaging the apertures in the four sides of the TETRA stencil. Based on favorable customer feedback and a relative absence of other plausible factors, we attribute the commercial success of the TETRA stencil primarily to the provision of slots along all four of its edges, as described in the claims of USSN 09/586,824, and the consequent capacity of the TETRA stencil for being engaged and tensioned by the TETRA frame along all four edges and the resulting decrease or elimination of the bowing effect that plagued the MicroMount stencil. I do

not believe that there were any other significant changes in the market (particularly, in terms of overall customer stencil demand) or in our advertising and marketing (or that of others) that would account for the magnitude of improvement in frameless stencil sales after the introduction of the TETRA stencil.

14. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that willful false statements may jeopardize the validity of this application and any patent issuing therefrom.

Dated: SEPTEMBER 7TH, 2004

by:

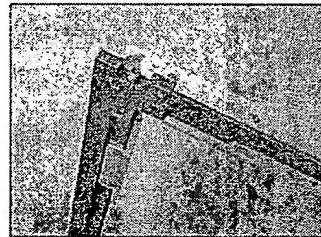
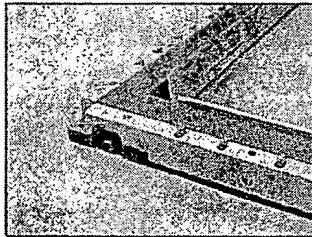
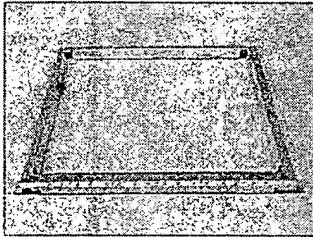

Valentijn Van Velthoven

Quick Tensioning Systems, Inc.

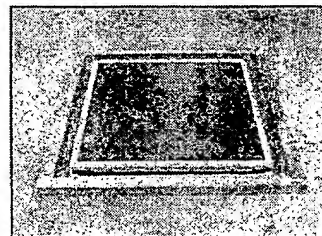
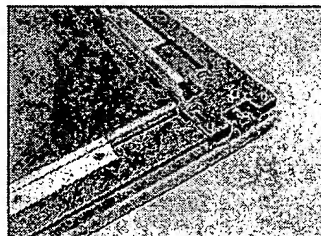
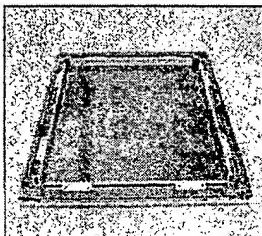
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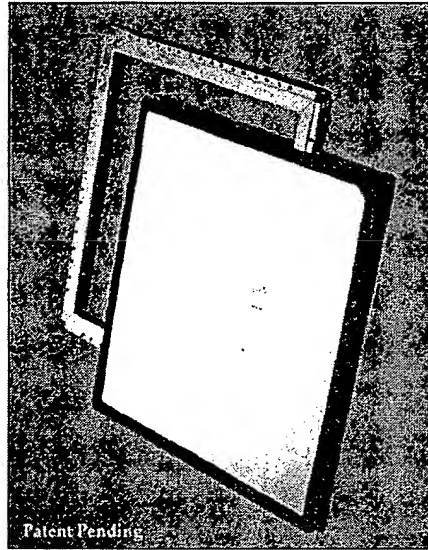
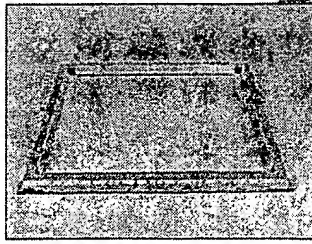
QTS INC.

Introduces a new stencil STRETCH
FRAME call "The Wizard" for the
Surface Mount Solder Paste Stencil
Printing Industry.



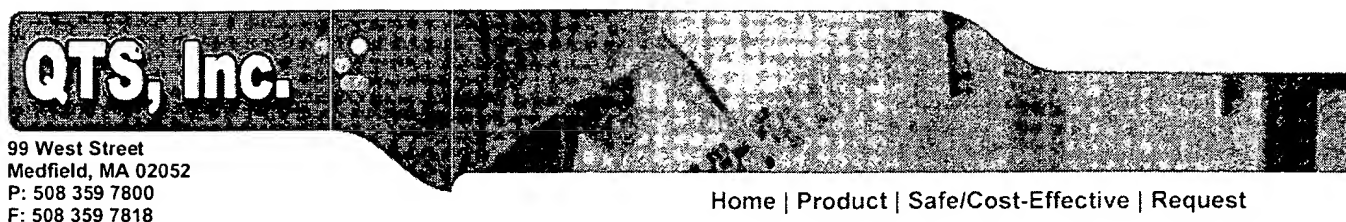
This System Consists of two frames;
the first frame is a plastic border
container frame which protects the
technician from injuries during handling
the foil from its razor sharp edges. The
foil itself is being contained in a molded
plastic border frame at all times,
reducing chances for damaging the foil
during shipping and handling.



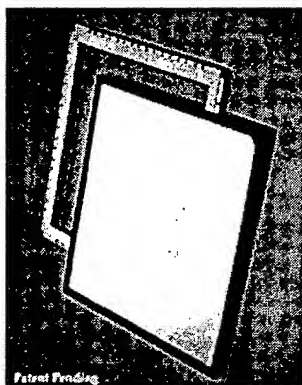


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QTS, Inc. introduces the new stencil stretch frame called **The Wizard** for the surface Mount Solder Paste Stencil Printing Industry.



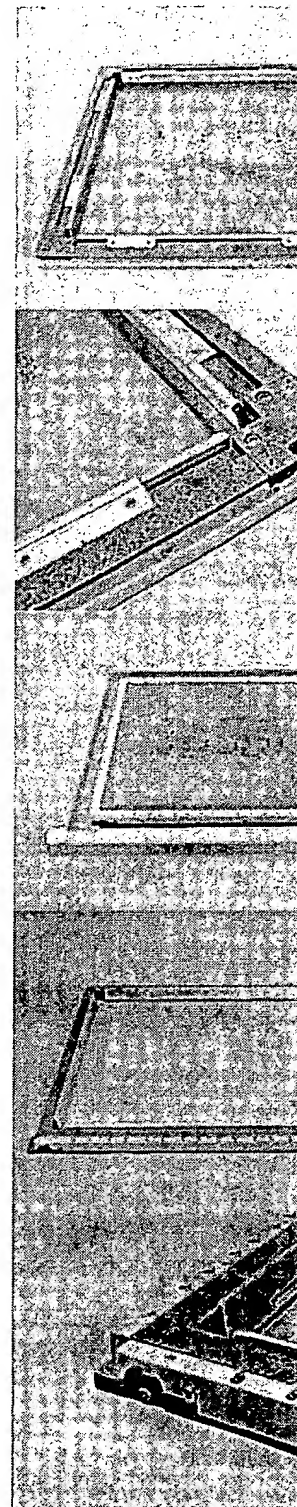
The Wizard Frame System consists of two frames and a stencil. The first frame is a plastic Container Frame (Patent pending) which protects the technician from injuries during handling from the stencil's razor sharp edges. the stencil is always contained in a molded plastic Container Frame that reduces the chance for damaging the stencil during shipping and handling. The second frame, (The Wizard) is a lightweight aluminum stretch frame, which accepts the Plastic Frame with the stencil and tensions this stencil in four directions.

This new twin frame system offers the following ADVANTAGES over the conventional aluminum castings and tubular frames:

1. Significant cost savings when ordering stencils with the Container Frame from your stencil manufacturer or QTS, Inc.
2. The availability of a larger image printing area.
3. Reduced storage space requirements. (Seventy 29"x29" stencils require less than 2.5'x3' of floor space. Seventy 20"x 20" stencils require less than 2x3 feet of floor space)
4. Lowers shipping charges.
5. Shorter turn around time.
6. Eliminates the need to return used frame castings.
7. Reduces setup time. (Stencils can be changed over within 10 seconds without tools.)
8. Stencil tension does not decrease with extensive use.
9. The Container Frame with stencil is machine washable.

Design Features:

- Wizard Frame has four-way adjustable tension for fragile stencils.
- 64 contact points (20x20) and 80 contact points (29x29) from the Wizard Frame to the stencil for even tension.
- 28 contact points from the Container Frame to the stencil that ensures a secure connection to the stencil.
- Allows for larger board image.
- Standard industrial mounting.





LTC Laserdienstleistungen GmbH & Co. KG

Quellenweg 18, D-75331 Engelsbrand

Tel. ++ 49 (0) 70 82 / 92 59-0, Fax ++ 49 (0) 70 82 / 92 59-50, e-Mail: lrc-box@lrc.de

[SMD-Stencils]

- LTC-Polish
- LTC-Protection

[QUATTRO-FLEX®

Self-Tensioning-Frame-System]

[Archive Cabinet]

[Cleaning Equipment]

[CAD-Software Ranger /
CAMTASTIC]



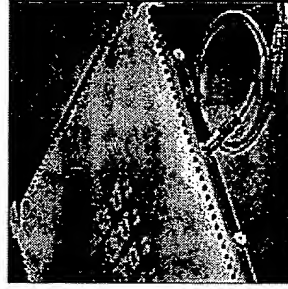
QUATTRO-FLEX® 4-sides Self-Tensioning-Frame-System (pneumatic)

Performance and service:

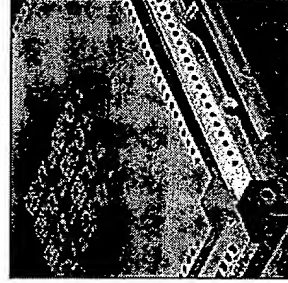
- V2A- and Aluminum frames
- cleaning frames
- QUATTRO-FLEX® self-tensioning-frame-system
- archive cabinet
- archive bags

Why and how fast does the QUATTRO-FLEX® rapid-clamping-frame pay itself.

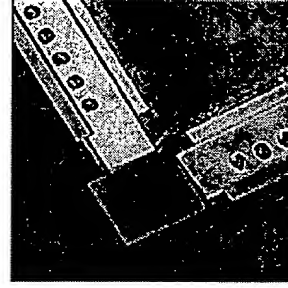
QUATTRO-FLEX®-II — the onliest pneumatic self-tensioning-system without compromise



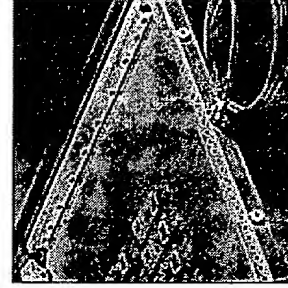
With QUATTRO-FLEX®-II we have optimized the successful 4-side-tensioning-system.



Easy operating by installing the stencil.



The tooling pins are at the outside. The working-area is now 30% bigger.



The tooling pins are now pistons. The tensioning of the stencil is now even better under control. It is a stepless regulation of the tension.

Frame size — working area:

20" * 19,2" — 15,7" * 15,7"
24,4" * 16,5" — 20,5" * 12,5"
28,9" * 28,9" — 18,7" * 18,7"
28,9" * 28,9" — 24,4" * 18,7"

20,8" * 16,9" — 16,9" * 12,9"
28,3" * 18,8" — 24,4" * 14,9"
28,9" * 28,9" — 20,5" * 18,7"
other dimensions on request

23" * 22,2" — 18,7" * 18,7"
28,3" * 22,9" — 24,4" * 18,7"
28,9" * 28,9" — 24,4" * 14,9"

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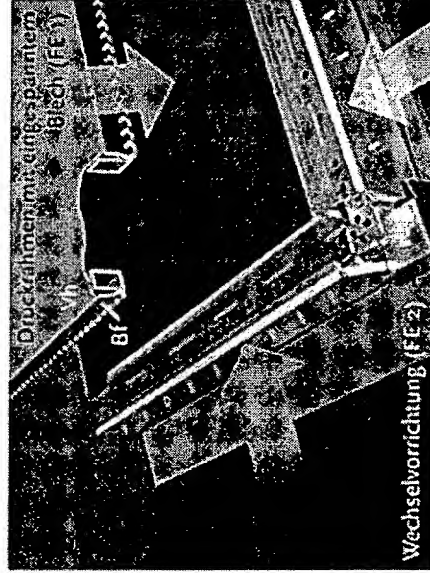
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LJ tensioning system

The two piece LJ tensioning system is a superior exchange system for metal stencils.

Unit 1 (FE1) is a passive tensioning and fully washable metal frame. The surprisingly simple construction combines high reliability with robustness and uniform high tension. The welding of the connecting hooks (Vh) to the stencil ensures that the tension of the leaf springs (Bf) is applied to the entire surface of the sheet and results in a precise positioning of the stencil even with high squeeze pressures.

Unit 2 (FE2) tensions the leaf springs on the metal frame for the stencil exchange. Emphasis is once again on high reliability and simple construction elements. Handling is simple and proof against misoperation.

The LJ tensioning system can be used without problem with any printer and frame size. A practical hanging storage system is available for the stencils. Each stencil requires a storage space of 15mm.

[>> Animation](#)

Breite Tiefe H—he Gewicht m.Bodenwanne F_1lvolumen Waschtank F_1lvolumen Sp_1tank

Der Aufbau des Spannsystems LJ 745



1. Der Wasch-und Halterahmen

2. Die Schablone

3. Der Spannrahmen

4. Die Arbeitsstation

zurück ◀ ▶ vor

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